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Signed

*R. Mahoney*

Dated 13 January 2004

01 E752293-1 C89826  
P01/7700 0.00-0222712.2

Patents Form 1/77

Patents Act 1977  
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THE PATENT OFFICE

- 1 OCT 2002

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The  
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Office

1/77

# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road  
Newport  
Gwent NP9 1RH

1. Your reference

RAZOR

2. Patent application number

(The Patent Office will fill in this part)

01 OCT 2002

0222712.2

3. Full name, address and postcode of the or of each applicant (underline all surnames)

WILLIAM ANTHONY DENNE

THE LANE HOUSE

108 CHURCH STREET

Patents ADP number (if you know it)

GREAT SHELFORD

If the applicant is a corporate body, give the country/state of its incorporation

CAMBRIDGE CB2 5RL

4. Title of the invention

ZIRCONIA RAZOR FOIL

3284502001

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

AS IN 3 ABOVE

Patents ADP number (if you know it)

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

N/A

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

N/A

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

NO

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body. See note (d))

**Patents Form 1/77**

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	0
Description	2
Claim(s)	0
Abstract	1
Drawing(s)	0

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent (Patents Form 7/77)	
Request for preliminary examination and search (Patents Form 9/77)	
Request for substantive examination (Patents Form 10/77)	
Any other documents (please specify)	

N  
A

11.

I/We request the grant of a patent on the basis of this application.

Signature

W. A. Denne

Date 01/04/02

12. Name and daytime telephone number of person to contact in the United Kingdom

01223 846191

**Warning**

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

**Notes**

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

## ZIRCONIA RAZOR FOIL

Electric razors have been in use for many decades. They comprise a pierced foil and cutter. The foil is generally electroformed from nickel, which provides a very sharp edge but of limited hardness.

- 5 According to the present invention, there is an electric razor foil made from zirconia ceramic. The zirconia may be partially or fully stabilised. The foil may be fabricated by screen printing the foil plan form onto a hydrophilic surface with a zirconia based ink, such that flow of the ink under surface tension forces generates very sharp edges to the ceramic foil. The planar hydrophilic surface may be combustible so that it
- 10 vanishes during firing. The surface is preferably a plastic film of good surface finish. The foil network may be biaxially extensible to conform to the skin. The cutter may also be in the form of a zirconia foil. The zirconia print and plastic film may be formed prior to firing. Vacuum forming may be appropriate. Appropriate binders and plasticisers in the zirconia ink may stop cracking of the ceramic print during the
- 15 forming process.

Electric razor foils are generally made by electroforming nickel. This is a relatively expensive process and the hardness of the resulting nickel cutting edges is not as great as it might be.

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Partially stabilised zirconia has the hardness and toughness of tool steel. It has excellent wear characteristics and takes a very keen edge. While it is much more expensive, the quantity in a razor foil is minimal and it may be fabricated more cheaply than electroforming.

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## ZIRCONIA RAZOR FOIL

A razor foil pattern may be precisely screen printed onto a plastic film with a zirconia ink. If the film is slightly hydrophilic it may be arranged, by controlling the ink properties, that the edges of the print may run slightly under the influence of surface tension forces to provide an extremely sharp edge. Even a low cost plastic film may  
5 have a surface finish approaching optical quality and the zirconia print will accurately reproduce this.

The printed plastic film may be fired in the conventional manner. The plastic will burn away at a low temperature and the zirconia will form a very thin foil of extreme  
10 toughness. It will maintain its sharpness for a very long while.

It is possible to print the foil pattern in a manner that permits biaxial extension to follow the contours of the skin. It is also possible to create a cutter in foil form which will follow the outer foil and provide a flexible cutting surface.  
15

The printed plastic may be vacuum formed if desired. This permits the forming of the profiled cutters used in current multi head shavers. The form may also be exploited to assist with maintaining dimensional stability during the firing process.

**ZIRCONIA RAZOR FOIL****Abstract**

- 5    Stabilised or partially stabilised zirconia paste may be screen printed onto hydrophilic plastic film in the form of a mesh. On firing, this may become a very sharp foil for electric razors with excellent wear and flexibility characteristics.

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